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XV.—*A Monograph of the Indian species of Phylloscopus and its immediate affines.* By EDWARD BLYTH*.

THERE is no group of birds more difficult to the student of Indian ornithology than the very extensive series of small *Becfins*, or "Warblers," known to the French as *Pouillots*, and in parts of England by the name of *Pettychaps*. It is exemplified in Europe by four well-known species†; and as an *avis rarissima* in Europe, the common Indian *Motacilla proregulus*, Pallas (*Regulus modestus*, Gould), which strictly appertains to the series under review, has been obtained in Dalmatia and in Britain;

* From the Journal of the Asiatic Society of Bengal, No. 5, 1854.

† 1. *Phylloscopus sibilatrix*; *Motacilla sibilatrix*, L.; *Sylvia sylvicola*, Latham. Type of *Sibilatrix*, Kaup.

2. *Ph. Bonelli*; *Sylvia Bonelli*, Vieillot; *S. Nattereri*, Temminck.

3. *Ph. trochilus*; *Motacilla trochilus*, L.; *Sylvia fitis*, Bechstein; also, according to M. Degland, *S. icterina*, Temminck (nec Vieillot); *S. flaviventris*, Vieillot; *S. angusticauda*, Gerbe; and *S. tamaricis*, Crespigny.

4. *Ph. rufus*; *Curruca rufa*, Brisson; *Sylvia collybita*, Vieillot; *S. loquax*, Herbert; and by the older British ornithologists erroneously assigned to *Motacilla hippolais*, L.

In addition to these four, in N. Africa, Dr. Rüppell describes—

Ph. umbrovirens; *Sylvia umbrovirens*, Rüppell (described but not figured in his Neuen Wirbelthieren, Vogel, p. 112). From Abyssinia.

Ph. brevicaudatus; *Sylvia brevicaudata*, Rüppell, Atlas, t. 35. From Kordofan.

Another that will probably have to be added to the European fauna is—

Ph. brevirostris; *Sylvia brevirostris*, Strickland, P. Z. S. 1836, p. 98. Procured at Smyrna. Differs from *Ph. rufus* in its greater size, and from *Ph. trochilus* "in the shortness of the beak and the dark colour of the legs."

Lastly, two species are briefly described in Dr. Horsfield's Catalogue of

while three of the European species have been stated to occur in India, but at a time when the various Indian Pouillots were undescribed and the multiplicity of distinct species of them was unsuspected. As neither of them, however, would appear to have been met with in the country since the numerous Indian species have been recognized, we are led to infer that certain other species were mistaken for them; and it is highly probable that the *Sylvia sibilatrix* of Dr. Royle's list* refers to our *Ph. nitidus*, and Mr. Gould's *S. trochilus* of W. India † to our *Ph. viridanus*; and perhaps M. Temminck's *S. trochilus* of Japan may likewise prove to refer to some nearly affined species, which he failed to distinguish from the *trochilus* of Europe ‡.

The Indian species have been described under various generic names; and even now it would not appear that systematists are agreed whether to range the accepted typical form, that of *Motacilla trochilus*, L., under *Phyllopneuste* of Meyer (1822), which included also the distinct form of *Mot. hippolais*, L., regarded by Mr. G. R. Gray (in 1841) as typical of *Phyllopneuste*,—or in *Phylloscopus*, Boie (1826), of which *M. trochilus* is cited as typical. In M. Degland's 'Ornithologie Européenne' (1849), *M. hippolais*, L., with three European congeners is referred to *Hippolais*, Brehm (1828), the typical species being termed *H. polyglotta* (Vieillot); and *M. trochilus* and its congeners are as-

Javanese Birds, Trans. Linn. Soc. xiii. 156; neither of which can we identify with Indian species: viz.—

Ph. javanicus; *Sylvia javanica*, Horsfield: seemingly affined to our *Ph. magnirostris*. And

Ph. montanus; *Sylvia montana*, Horsfield: apparently affined to our *Ph. tristis*. Of *Ph. montanus* (Horsf.), the late lamented Hugh E. Strickland informed us, that "the wing is 2 in. long, graduated, with the fifth quill longest."

Mr. Strickland adds, from Java,—

Ph. trivirgatus; *Sylvia trivirgata*, Temminck: a species referable to Mr. Hodgson's group *Abrornis*; and it is probable that others of this minor group, from the Archipelago, remain to be described.

* Ill. Him. Bot. Introd. p. lxxvii. In this list are enumerated "*Sylvia sibilatrix*, *S. rufa* (plains), *S. trochilus*, and several species undetermined." It is not probable that either of the names specified is correctly applied; nor certain others in the same list, as especially *Gallus Sonneratii*!

† Proc. Zool. Soc. 1850, p. 90.

‡ Some Japanese birds which we saw with Mr. Gould, sent by M. Temminck, and identified by him with European species, certainly presented differences more or less marked. We especially remember the Japanese Robin, Jay, and Bullfinch. The last is probably *Pyrrhula griseiventris*, Lafresnaye, Rev. Zool. de la Soc. Cuv. 1841, p. 241.—Since this note was penned, we have seen Mr. Gould's figure of the Japanese Bullfinch, in his 'Birds of Asia,' where it is designated *P. orientalis*, Temminck and Schlegel. The Jay, too, is cited by the Prince of Canino as *Garrulus japonicus*.

signed to *Phyllopneuste*. An older name than *Hippolais*, Brehm, occurs, however, in *Ficedula*, Koch (1816), which is adopted by Dr. Rüppell for the Pouillots*, and by Dr. Schlegel for both groups †; but it is faulty as implying these birds to be fig-eaters (or *Beccaficos*), whereas all of the series are exclusively insectivorous, and in no way to be confounded with the highly frugivorous Fauvettes ‡.

In former papers we followed Mr. Gray's arrangement, but with this error, that certain Indian species were assigned to *Phyllopneuste* apud Gray (v. *Hippolais*, Brehm); whereas upon referring to the characters of this genus, as specified by M. Degland, we find that we had misapprehended it, and incline now to suspect that with it should be united the divisions *Culicipeta*, *nobis*, and *Abrornis*, Hodgson.

In a series of twenty-two species actually before us, excluding *Regulus*, we observe that one only, the European *Phylloscopus sibilatrix* (type of *Sibilatrix*, Kaup), is remarkable for the comparative great length of its wings; whereof the first primary is minute and the second is nearly as long as the third. In all the rest, the small first primary is considerably less diminutive, and the second is much shorter than the third: the proportions varying, however, to some extent, and the wing being more or less rounded in different species; affording a good differential character in several instances. In general, the wings are shorter and more rounded than in the European *Ph. trochilus*; but looking to the *ensemble* of characters, it seems doubtful whether more than three divisions can be retained in the whole series under review. These are: *Phylloscopus*, certain species of which (constituting the *Reguloides*, *nobis* §) offer a close approximation to *Regulus*, and serve to indicate the true systematic position of that genus,—*Regulus* (which M. Degland and others have arranged near *Parus*),—and *Culicipeta* (including *Abrornis*), which should perhaps be merged in *Phyllopneuste* (v. *Hippolais*). Under these three groups only, we now comprise the following Indian species.

* Systematische Uebersicht der Vogel Nord-ost Afrika's (1845), p. 57.

† Revue critique des Oiseaux d'Europe (1844), pp. 25, 26.

‡ The four European species described by M. Degland under *Hippolais* are as follows:—

1. *H. polyglotta*; *Motacilla hippolais*, L.; *Sylvia polyglotta*, Vieillot; *H. salicaria*, Bonap.

2. *H. icterina*; *Sylvia icterina*, Vieillot (nec Temminck); *S. hippolais* apud Temminck, Manuel, 2nd edit. (1820).

3. *H. olivetorum*; *Sylvia olivetorum*, Strickland.

4. *H. elaica*; *Salicaria elaica*, Lindermayer; *Ficedula ambigua*, Schlegel.

§ J. A. S. xvi. 442.

I. Genus PHYLLOSCOPUS, Boie, apud G. R. Gray.

Type *Motacilla trochilus*, L.*

1. PHYLLOSCOPUS RAMA.

Sylvia rama, Sykes, P. Z. S. 1832, p. 89.

There appear to be two races of this bird, differing a little in shade of colour, but in no other particular that we can discern. The bill is rather thicker and the form less slender than in most others of the genus; and together with the colouring, approximate it to *Calamoherpe*, Boie, for a species of which it might be mistaken at first sight†; but the form of the wings and tail, and general character, sufficiently indicate its true position to be as here arranged.

Length 5 in. by $7\frac{1}{2}$ in. in alar expanse: wing $2\frac{5}{8}$ to $2\frac{1}{2}$ in.; 1st primary $\frac{9}{16}$ in., the second $\frac{5}{8}$ in. shorter than the third, which about equals the 4th and 5th: tail $2\frac{1}{8}$ in.; its outermost feather $\frac{1}{8}$ in. shorter: bill to gape $\frac{5}{8}$ in.: tarse $\frac{3}{4}$ in. Irides dark. Bill dusky above, light carneous below: legs light brown, tinged with plumbeous on the joints. Plumage, above uniform light grayish-brown; below pale or albescent, passing to white on the chin, middle of belly and vent: lores, continued as a slight streak passing over the eye, and the orbital feathers, pale.

This bird is very common in Lower Bengal during the cold season, upon sandy soil above the tideway of the rivers; haunting baubul topes and scattered trees near villages, as well as hedges and bush-jungle. Those of S. India have a slight ferruginous tint throughout; but we can detect no further difference. It would not appear to inhabit the sub-Himalayan region.

* A better average type exists in *Ph. rufus*, v. *Curruca rufa*, *Brisson*.

† We have three Indian species of *Calamoherpe*, all distinct from those of Europe.

1. *C. brunnescens*; *Agrobates brunnescens*, *Jerdon*. Very like the European *C. arundinaceus* (*Turdus arundinaceus*, *L.*; *Sylvia turdoides*, *Meyer*); but easily distinguished by the form of the wing, in which the second or first developed primary is constantly $\frac{1}{4}$ in. shorter than the next, and the third, fourth and fifth are subequal.

2. *C. dumetorum*, *nobis*, J. A. S. xviii. 815.

3. *C. agricola*, *Jerdon*, *Madr. Journ.* xiii. pt. 2. p. 131; J. A. S. xiv. 595. This much resembles the European *C. salicaria* (*Motacilla salicaria*, *Gmelin*; *C. alnorum*, *Brehm*; *Mot. arundinacea*, *Lightfoot*); but is readily distinguished from it, as is also *C. dumetorum*, by the same difference in the proportion of the primaries as exists in the species before cited.

The three Indian species of *Calamoherpe* accordingly tend to approximate *Phylloscopus* in the form of the wing, and they have also less aquatic habits than their European congeners.

2. PHYLLOSCOPUS MAGNIROSTRIS, nobis, J. A. S. xii. 966.

Phyllopneuste indica, nobis, J. A. S. xiv. 593.

Ph. trochilus? apud Hodgson, Gray, Zool. Misc. 1844, p. 82.

Length 5 to $5\frac{1}{4}$ in., by $8\frac{1}{4}$ in. across: wing $2\frac{5}{8}$ to $2\frac{3}{4}$ in., its first primary measuring $\frac{3}{4}$ in., and the second being $\frac{7}{16}$ in. shorter than the third, which does not quite equal the 4th and 5th: tail 2 to $2\frac{1}{8}$ in., its two outer feathers on each side very slightly graduating: bill to gape $\frac{5}{8}$ in.: tarse $\frac{3}{4}$ in. Irides dusky. Bill dusky plumbeous above, fleshy horn-colour at base of lower mandible. Legs albescent plumbeous. Plumage, duskyish or infuscated olive-green above, having a faint tinge of tawny, especially on the wings and tail; the medial larger coverts of the wings being tipped with albescent-greenish: a narrow but conspicuous pale yellowish supercilium, and the lower ear-coverts are partly of the same hue: under parts pale; the breast tinged with ashy, mingled with faint yellowish; and the rest of the lower parts are more or less of a purer yellowish-white. The tawnyish hue of the wings and tail resembles that of the upper parts of the European *Ph. rufus*, whence the name of the latter species.

The species appears to be generally diffused over the country, and we have seen specimens from the eastern coast of the Bay of Bengal, and also one from Chusan. We have been informed that it has a pleasing song.

3. PHYLLOSCOPUS LUGUBRIS, nobis, J. A. S. xii. 968.

Length $4\frac{3}{4}$ to $4\frac{7}{8}$ in., by $7\frac{1}{2}$ in. across: wing $2\frac{1}{2}$ in.; first primary $\frac{3}{4}$ to $1\frac{1}{8}$ in., and the second $\frac{5}{16}$ in. shorter than the third, which does not quite equal the 4th and 5th: tail $1\frac{7}{8}$ in., subeven: bill to gape nearly $\frac{5}{8}$ in.: tarse $\frac{3}{4}$ in. Irides dusky. Bill dusky above, and also on the medial part of the lower mandible; the rest amber-coloured. Legs pale greenish-dusky. Plumage, above dusky olive-green, nearly as in the last species, but without the tawny shade; also a similar pale yellowish supercilium, and tips to the medial wing-coverts: below albescent, faintly tinged with yellow medially, and laterally with the hue of the flanks.

Common in Lower Bengal during the cold season, and more or less so over the country generally.

4. PHYLLOSCOPUS AFFINIS.

Motacilla affinis, Tickell, J. A. S. ii. 576.

Ph. flaveolus, nobis, *passim*.

Abrornis xanthogaster, Hodgson, Gray, Zool. Misc. 1844, p. 82.

Length $4\frac{3}{8}$ to $4\frac{1}{2}$ in., by $6\frac{1}{2}$ to 7 in. in expanse: wing $2\frac{1}{8}$ to $2\frac{3}{8}$ in.; having the first primary $\frac{3}{4}$ in., and the second $\frac{5}{16}$ in.

shorter than the third, which almost equals the 4th and 5th : tail $1\frac{3}{4}$ to $1\frac{7}{8}$ in., its outermost and penultimate feathers very slightly graduating : bill to gape $\frac{1}{2}$ in., or a trifle more : tarse $\frac{5}{4}$ in. or nearly so. Irides dark. Bill dusky above, amber-coloured below : legs pale brownish-dusky, tinged with yellow ; the soles more or less yellowish. Plumage, above fuscous olive-green, with an extremely faint tawny tinge ; no pale tips to the medial wing-coverts : supercilia, cheeks and under parts, pale sullied yellow, brightest on the middle of the belly, with a slight tawny tinge in some, and the breast and flanks a little infuscated.

This species might be supposed to be the young of the preceding, in corresponding yellowish garb to the young of *Ph. trochilus* and *Ph. rufus* ; but on minute comparison of freshly killed specimens, they are seen to be distinct. The bill is more feeble, and much more compressed, in *Ph. affinis* ; whereas in *Ph. lugubris* it is very little compressed, and the rictal setæ are considerably more developed. The colour of the legs is also very different, being in *lugubris* pale greenish-dusky, while in *affinis* there is a strong tinge of brown. From examination of a great number of specimens, we feel convinced that the colouring here described is permanent.

This species is common in Lower Bengal, more so above the tideway of the rivers, and we believe that it is generally distributed over India.

5. PHYLLOSCOPUS INDICUS.

Sylvia indica, Jerdon, Madr. Journ. xi. 6.

Ph. griseolus, nobis, J. A. S. xvi. 443.

Length $5\frac{1}{4}$ in. by $7\frac{1}{4}$ in. : wing $2\frac{5}{8}$ in. ; having the first primary $\frac{7}{8}$ in. long, and the second $\frac{3}{8}$ in. shorter than the third, which equals the sixth, and is scarcely shorter than the fourth and fifth : tail 2 in. : bill to gape $\frac{9}{16}$ in. : tarse $\frac{5}{4}$ in. Irides very dark brown. Bill dusky above, below pale amber : interior of the mouth whitish, with scarcely a tinge of yellow. Tarse externally, and the toes above, light brown ; internally and beneath, yellow. Plumage, above uniform dull ash-colour, without a tinge of green : supercilia clear pale yellow : lower parts pale dull yellowish, purer on the middle of the belly, and the rest more or less tinged with dull tawny.

This species appears to be found chiefly in the peninsula of India, and is rare in Lower Bengal.

6. PHYLLOSCOPUS FUSCATUS, nobis, J. A. S. xi. 113.

Ph. brunneus, nobis, J. A. S. xiv. 591 (the young).

Length 5 to $5\frac{1}{4}$ in., by $7\frac{1}{8}$ to $7\frac{3}{8}$ in. : wing $2\frac{1}{4}$ to $2\frac{3}{8}$ in. ; having

the first primary $\frac{1}{8}$ to $\frac{5}{8}$ in., and the second $\frac{5}{8}$ in. shorter than the third, which equals the sixth, and is a little shorter than the fourth and fifth: tail $2\frac{1}{8}$ in., with its outermost feathers $\frac{3}{8}$ in. shorter than the middle ones: bill to gape nearly $\frac{5}{8}$ in.: tarse $\frac{7}{8}$ in. Irides dark hazel. Bill dusky above, yellowish at base of lower mandible; inside of the mouth rather pale yellow: legs greenish-brown. Plumage, above uniform olive-brown; below albescent, purest on the throat and middle of belly, and weakly tinged with a ferruginous or ruddy hue on the pale supercilia, sides of neck, flanks and lower tail-coverts, and more faintly on the breast; axillaries also weak ferruginous, with the fore part of the under surface of the wing; and the primaries are slightly margined with pale rufescent: no trace whatever of a wing-band. The young (*Ph. brunneus*, nobis, *passim*) resemble the adults in colour, but the wings and tail are rather shorter, and the plumage is of somewhat more open texture.

Not rare in Lower Bengal during the cold season; but commoner, it would seem, to the eastward, and especially in Arakan.

7. PHYLLOSCOPUS VIRIDANUS, nobis, J. A. S. xii. 967*.

Abrornis tenuiceps, Hodgson, Gray, Zool. Misc. 1844, p. 83. (Perhaps *Ph. trochilus* of W. India apud Gould.)

Length $4\frac{3}{4}$ to $5\frac{1}{8}$ in., by $7\frac{1}{4}$ to $7\frac{1}{2}$ in.: wing $2\frac{1}{4}$ to $2\frac{1}{2}$ in.; its first primary $\frac{5}{8}$ to $\frac{3}{4}$ in., and the second $\frac{1}{4}$ in. shorter than the third, which equals the fourth and fifth: tail $1\frac{5}{8}$ to 2 in.: bill to gape nearly $\frac{5}{8}$ in.: tarse $1\frac{1}{6}$ to $\frac{3}{4}$ in. Irides dusky. Bill dusky horn-colour above, the under mandible yellowish except towards tip. Legs pale greenish-plumbeous. Plumage, above light dull olive-green, beneath greenish-albescent: a pale yellow streak over the eye; and a slight whitish bar on the wing, formed by the tips of its larger coverts.

The commonest species of the genus in Lower Bengal; and we believe generally diffused. The only sound we have heard it utter is a faint *tiss-yip* frequently repeated; but never a number of times in continuous succession, like the much louder *tsih-tseh* of the European *Ph. rufus*.

8. PHYLLOSCOPUS NITIDUS, nobis, J. A. S. xii. 965.

Muscicapa nitida?, Latham, Franklin.

Sylvia hippolais, apud Jerdon, Madr. Journ. xi. 6.

Hippolais Swainsoni, Hodgson, Gray, Zool. Misc. 1844, p. 82. (Probably *Sylvia sibilatrix* of Royle's list.)

Length $4\frac{1}{2}$ to $4\frac{3}{4}$ in., by $7\frac{5}{8}$ to $7\frac{1}{2}$ in. across: wing $2\frac{3}{8}$ to $2\frac{5}{8}$ in.;

* *Phyllopneste rufa* apud nos, J. A. S. xi. 191; and *Ph. affinis*, Ann. & Mag. Nat. Hist. 1843, vol. xii. p. 98.

having the first primary $\frac{9}{16}$ to $\frac{5}{8}$ in., and the second $\frac{3}{8}$ in. shorter than the third, which equals the fourth and exceeds the fifth : tail $1\frac{7}{8}$ to 2 in. : bill to gape $\frac{5}{8}$ in. ; and tarse $\frac{3}{4}$ in. Irides dark. Bill carneous-dusky, the lower mandible pale ; and legs light brownish, tinged with yellow on the toes. Plumage, above of a much livelier green than in any of the preceding, resembling that of the European *Ph. sibilatrix* ; below unsullied pale yellowish, brightest about the breast ; and there is a pale wing-band, formed by the tips of the larger coverts of the secondaries.

This pretty species appears to be very generally distributed, but is somewhat rare in Lower Bengal.

9. PHYLLOSCOPUS TRISTIS, nobis, J. A. S. xii. 966.

Sylvia trochilus, apud Jerdon, Madr. Journ. xi. 6.

Length $4\frac{1}{2}$ to 5 in. by $6\frac{1}{2}$ to $6\frac{7}{8}$ in. : of wing $2\frac{1}{8}$ to $2\frac{1}{2}$ in. ; the first primary $\frac{3}{4}$ in. (in large specimens), and the second $\frac{1}{4}$ in. shorter than the third, which equals the fourth and fifth : tail $1\frac{3}{4}$ to 2 in. : bill to gape $\frac{1}{2}$ in. ; and tarse $\frac{9}{16}$ to $\frac{3}{4}$ in. Irides dark. Bill blackish, tinged with yellow at base of lower mandible ; and gape also yellow : legs dull black. Plumage, above uniform dull brown : below albescent, with a faint tinge of ruddy or ferruginous on the pale supercilia, sides of neck, breast and flanks ; and no tinge of yellow except on the axillaries and fore part of the wing underneath, which are almost pure light yellow. Bill small and slender.

A common species, and generally diffused. We once observed it in great abundance, together with *Calamoherpe agricola*, haunting low bushes near the Calcutta salt-water lake.

10. PHYLLOSCOPUS OCCIPITALIS.

Phyllopneuste occipitalis, Jerdon, nobis, J. A. S. xiv. 593.

Length $4\frac{3}{4}$ in. : of wing $2\frac{5}{8}$ in. ; the first primary $\frac{3}{4}$ in., and the second $\frac{5}{16}$ in. shorter than the third, which nearly or quite equals the fourth and fifth : tail 2 in., even or squared : bill to gape $\frac{5}{8}$ in. : tarse $1\frac{1}{16}$ in. Alar and caudal feathers unusually firm. Bill light dusky above, pale below : legs pale. Plumage, above mingled green and ashy, the latter prevailing on the back, the former on the rump, wings and tail ; crown dusky, with whitish supercilia, and a conspicuous pale medial line, broader and tinged with yellow at the occiput : a slight but distinct yellowish-albescent wing-band ; the fore part of the wing brightish green ; and its margin, with the axillaries, pure light yellow. Lower parts albescent, mingled with yellowish, and very faintly tinged with ruddy. Inner webs of the three outer tail-feathers

on each side narrowly bordered with white, the ante-penultimate less so.

This pretty species we have only seen from the Deyra Doon and from S. India. In colouring it approximates the groups *Reguloides* and *Abrornis*; but the remarkable firmness of its wings and tail is peculiar, and prohibitive of its association with either.

The next three species (constituting the subgroup *Reguloides*, nobis) have, like the last, a pale medial streak on the crown, and they greatly approximate the genus *Regulus* in figure and proportions, and even in colouring (minus the developed crest); but their habits are those of other *Phylloscopi*.

11. PHYLLOSCOPUS TROCHILOIDES.

Acanthiza trochiloides, Sundevall (1837).

Phyllopneuste reguloides, nobis, J. A. S. xi. 191, xii. 963 (nec *reguloides* apud Hodgson).

Length of a male $4\frac{7}{8}$ in. by $7\frac{1}{4}$ in. : wing $2\frac{1}{2}$ in.; its first primary $\frac{1\frac{1}{6}}$ in., and the second $\frac{3}{8}$ in. shorter than the third, which equals the fifth and is a little shorter than the fourth; but, in some, these three are equal: tail $1\frac{7}{8}$ in., even: bill to gape $\frac{5}{8}$ in., or nearly so: tarse $\frac{1\frac{1}{6}}$ in. Length of a female $4\frac{1}{2}$ by $6\frac{7}{8}$ in.; wing $2\frac{3}{16}$ in.; and tail $1\frac{3}{4}$ in. Irides dark. Upper mandible dusky, the lower yellow; and legs yellowish-brown tinged with plumbeous. Plumage, above dull green, a little infuscated, with two conspicuous yellowish-white bars on the wing, formed by the tips of the greater and lesser coverts: below albescent-greenish, a little tinged with yellow: a broad yellowish-white or pale yellow supercilium; and above this a broad dusky band, leaving the middle line of the crown dull green like the back, but paling at the occiput; below the supercilium the colour is also dusky: axillaries, with the fore part of the wing underneath, yellow; and the outermost and penultimate tail-feathers have a narrow whitish margin to their inner web.

Inhabits the sub-Himalayas, and visits Lower Bengal in some abundance during the cold season. We have obtained one so late as March 15th in the vicinity of Calcutta.

12. PHYLLOSCOPUS PROREGULUS.

Motacilla proregulus, Pallas.

Regulus modestus, Gould; and, in abraded plumage, *R. inornatus*, nobis, J. A. S. xi. 19, and *Ph. montanus*, Hutton, nobis, Catal. no. 1105.

Phyllopneuste nitidus, Hodgson, G. R. Gray.

Length generally about 4 to $4\frac{1}{4}$ in. by 6 to $6\frac{1}{2}$ in. across: wing

$2\frac{1}{8}$ in. ; its first primary $\frac{1}{2}$ in.*, and the second not $\frac{5}{16}$ in. shorter than the third, which exceeds the sixth, and nearly or quite (in different specimens) equals the fourth and fifth : tail $1\frac{1}{2}$ to $1\frac{3}{4}$ in., even. An unusually large specimen measured $4\frac{1}{2}$ by 7 in. ; wing $2\frac{1}{4}$ in. : tail $1\frac{3}{4}$ in. : bill to gape nearly $\frac{5}{8}$ in. : tarse $1\frac{1}{6}$ in. Irides dark. Upper mandible dusky, the lower yellow except at tip ; and legs rather pale brown, without any plumbeous tinge. Bill nearly as much compressed as in *Regulus*. Plumage, above olive-green, brightest on the rump, wings and tail : crown dusky, with a pale mesial line, sometimes well defined, but in new plumage not very distinct ; and in much worn or abraded plumage it often disappears altogether, and the upper parts are then dingy grayish-brown, with scarcely a tinge of green : two conspicuous yellowish-white bars on the wing, the hinder more broad ; and behind this is a dark patch, corresponding to the black seen in *Regulus* : tertiaries conspicuously margined with whitish (as more or less in *Regulus*), and secondaries and some of the primaries slightly tipped with the same : axillaries, with the fore part of the wing underneath, pale yellow : supercilia and lower parts greenish-albescent.

Common in Lower Bengal, where a few perhaps breed ; but the great majority retire to the mountains for that purpose †. As an exceedingly great rarity, it has been met with in Dalmatia and in England. Habits as in other species of *Phylloscopus*, and not (as in *Regulus*) gregarious : song-note nearly similar to that of *Ph. sibilatrix*, but considerably weaker.

13. PHYLLOSCOPUS CHLORONOTUS.

Abrornis chloronotus, Hodgson, Gray's Zool. Misc. p. 82 ; G. R. Gray, 'Appendix to Catalogue of Specimens presented by Mr. Hodgson to the British Museum,' p. 152 ; v. *Regulus modestus* apud Hodgson.

Resembles the last, but is smaller, with bill conspicuously shorter and darker-coloured, and the rump pale canary-yellow, strongly contrasting with the hue of the back ; the median coronal line much more conspicuous, and the pale margins of the tertiaries less so. Its size is that of the European *Regulus cristatus*.

Length $3\frac{1}{2}$ in., or a trifle more : wing $1\frac{7}{8}$ to 2 in. ; its first primary $\frac{9}{16}$ in., the second $\frac{1}{4}$ in. shorter than the third, which does not equal the fourth and fifth : bill to gape about $\frac{1}{2}$ in., and tarse $\frac{5}{8}$ in. : tail $1\frac{1}{4}$ in. to $1\frac{5}{8}$ in. Upper mandible blackish, the lower pale except towards tip. Legs pale. In other respects

* In one only, of several specimens, $\frac{5}{8}$ in.

† A reputed nest, taken near Calcutta, is described J. A. S. xii. note to p. 965.

like the last, from which it is at once distinguished by its pale pure yellow rump.

This minute species appears to be peculiar to the sub-Himalayan region, where it is extensively distributed.

II. Genus REGULUS (antiq.), Cuvier.

Capt. Hutton states that both *R. ignicapillus* and *R. cristatus* of Europe inhabit the N.W. Himalaya. We have seen only a single male specimen, procured by Capt. Thomas at Simla; and this perfectly resembles *R. cristatus*, except in being considerably larger, and the fine flame-coloured interior crest would seem to be more developed. Length of wing $2\frac{3}{8}$ in., and of tail $1\frac{5}{8}$ in. In several British specimens of *R. cristatus*, the corresponding measurements are 2 in. and $1\frac{3}{8}$ in., with the rest in proportion. Should this difference in size prove constant, the race might be denominated *R. himalayensis*; requiring, however, to be first minutely compared with the N. American *R. satrapa*, Lichtenstein (v. *tricolor*, Jardine). Mr. Hodgson would not appear to have met with a true *Regulus* in Nepal.

III. Genus CULICIPETA, nobis, J. A. S. xii. 968.

“General structure of *Phylloscopus*, but having a narrow Flycatcher’s bill and armature of rictus, the ridge of the upper mandible angulated, and the breadth of the bill evenly attenuating.” Such are the characters of the first or typical species, to which may be added that the claws, especially that of the hind toe, are longer and less curved. In other species, however, the form grades to that of *Phylloscopus*; but there is a general and marked resemblance of colouring throughout the series, indicative of their unity as a group, and which would help to separate it from the European type, *Phyllopneste* (v. *Hippolais*). In general, the upper parts are green, the lower bright yellow wholly or in part, and the crown exhibits the colouring (variously modified) of *Phylloscopus occipitalis* and of the subgroup *Reguloides*; while the two or three outer tail-feathers are, in most of the species, largely marked with white on the inner web. Their habits appear to be quite similar to those of the *Phylloscopi*.

1. CULICIPETA BURKII.

Sylvia Burkii, Burton, P. Z. S. 1835, p. 153.

Acanthiza arrogans, Sundevall (1837).

Cryptolopha auricapilla, Swainson, 2 $\frac{1}{4}$ Centen. (1837).

Muscicapa bilineata, Lesson, Rev. Zool. de la Soc. Cuv. 1839, p. 104.

Length $4\frac{3}{8}$ by $6\frac{1}{2}$ in. : wing $2\frac{1}{4}$ in. ; its first primary $\frac{3}{4}$ in., and the second $\frac{5}{8}$ in. shorter than the third, which equals the sixth or

seventh (in different specimens), and is rather shorter than the intervening two or three: tail $1\frac{3}{4}$ in.: bill to gape exceeding $\frac{1}{2}$ in.; and tarse $\frac{1}{16}$ in. Irides dark. Bill dusky above; underneath, with the legs, pale amber or brownish-yellow, darker on toes. Plumage, above bright yellowish olive-green; below full siskin-yellow throughout; the cheeks and sides of neck intermediate: over each eye a broad black streak reaching to the occiput, leaving the middle of the head greenish, slightly flanked with ash-gray: tail dusky, its middle feathers margined with the hue of the back, and the inner web of the outermost white nearly throughout, as also the terminal half of that of the next. Some have a slight yellowish wing-band, which in others is barely indicated.

This pretty little bird is not uncommon in Lower Bengal during the cold season, and like the rest of its tribe retires to the sub-Himalayan region to breed. Its bill has more decidedly the Flycatcher form than any of the following.

2. CULICIPETA CANTATOR.

Motacilla cantator, Tickell, J. A. S. ii. 576.

C. schisticeps, Hodgson, Gray's Zool. Misc. 1844, p. 82; G. R. Gray, 'Appendix to Catalogue of Specimens presented by Mr. Hodgson to the British Museum,' p. 153.

Length $4\frac{1}{4}$ in., by $6\frac{3}{8}$ in. expanse: wing $2\frac{1}{4}$ in.; with primaries as in *C. Burkii*: tail $1\frac{3}{4}$ in.: bill to gape nearly $\frac{5}{8}$ in.; and tarse $\frac{5}{8}$ in. Irides dark. Bill light dusky above, amber-coloured below: legs light yellowish-carneous, with a leaden tinge. Plumage, bright olive-green above, yellower on the wings and tail: throat, cheeks, supercilia, lower tail-coverts, and margin of wing, bright yellow; the belly and flanks grayish-white: greater wing-coverts tipped with pale yellow, forming a slight bar on the wing: on each side of the crown a broad black band; and an intermediate narrow greenish one, becoming yellower upon the occiput: upper tertiaries very slightly margined at the tips with yellowish-white; and the tail-feathers have a narrow yellowish-white internal border.

This pretty species is rare in Lower Bengal, becoming commoner to the westward. The bill is narrower and the rictal setæ are less developed, while the claws (especially that of the hind-toe) are shorter and more curved than in *C. Burkii*.

3. CULICIPETA PULCHRA.

Abrornis pulcher, Hodgson, nobis, J. A. S. xiv. 592.

Abr. erochroa (?), Hodgson, Gray, Zool. Misc. 1844, p. 82 (undescribed); G. R. Gray, Appendix to Catalogue, p. 152.

Length $4\frac{1}{4}$ in., of wing $2\frac{1}{8}$ in., with primaries as in *C. Burkii*: tail $1\frac{3}{4}$ in.: bill to gape $\frac{1}{2}$ in.; and tarse nearly $\frac{3}{4}$ in. Bill

dusky above, below yellow or amber-coloured; and tarse pale. Plumage, above dull olive-green, brighter on the rump and margins of the wing and tail-feathers, those of the primaries yellowish, and a pale rufescent bar across the wing: two broad black streaks on the crown, and between them a dull greenish streak flanked with ashy: supercilia also dull green; but the orbital feathers are yellow; and the entire under-parts are pale dull yellow, or albescent-yellowish, becoming of a deeper yellow on the belly and lower tail-coverts: tail having its *three* outer feathers wholly white, save the terminal half of their outer web, together with the tip of the inner web of the ante-penultimate and slightly of the penultimate.

Inhabits the Nepal and Sikkim Himalaya*.

4. CULICIPETA SCHISTICEPS.

Abrornis schisticeps, Hodgson, nobis, J. A. S. xiv. 592.

Phyllopeuste xanthoschistos, Hodgson, Gray, Zool. Misc. 1844, p. 82 (undescribed); G. R. Gray, 'Appendix to Catalogue,' p. 151.

Length $4\frac{1}{4}$ in.: of wing $2\frac{1}{4}$ in., with primaries as in *C. Burkii*: tail $1\frac{5}{8}$ in.: bill to gape $\frac{5}{8}$ in.; and tarse $\frac{5}{8}$ in. Bill dusky above, below amber-coloured; and feet apparently pale brownish-plumbeous. Plumage, above pale ashy, passing to greenish-yellow on the rump, wings and tail: below, with the cheeks and lower half of the ear-coverts, wholly bright yellow: a whitish-gray supercilium and narrow medial streak upon the crown, and two broad ill-defined lateral streaks of rather a more dusky gray than that of the back: outermost and penultimate tail-feathers only, white on their inner webs. The young have looser plumage and all the colours less intense.

This appears to be very common throughout the sub-Himalayan territories, and is likewise met with in Arakan; but it appears never to descend from the hills. According to Capt. Hutton, it is a common species at 5000 ft. elevation, and com-

* Mr. G. R. Gray suggests that this may be the young of his *Abr. erochroa*, Hodgson, which he thus describes:—

“Length 5 in.; bill from gape $\frac{1}{2}$ in.; tarse $\frac{3}{4}$ in.: wings under $2\frac{1}{2}$ in. Upper surface olive-green; a streak over each eye from the nostrils, under surface and lower part of back, yellowish-white, brightest on the back [rump?] and vent: wings with the tips of the greater coverts broadly margined with rufous-white: quills brownish-black, narrowly margined with yellowish-green: tail slaty-brown, margined with yellowish-green, the outer feathers principally white.”

We suspect that this description merely refers to a fine specimen of *C. pulchra*; and may remark that the present is the only species of the series of which the Society possesses but an indifferent specimen. Of the rest, *C. castaneocephus* we have never seen; but all of the others, save four, we here describe from recent specimens shot near Calcutta! The four exceptions are—*Phylloscopus occipitalis* and *Ph. chloronotus*, and the two *Culicipeta* which next follow; and to these may be added the *Regulus*.

mences building in March. The nest would appear to resemble those of *Phylloscopus trochilus* and *Ph. rufus*. Eggs spotless white. Vide Hutton, in J. A. S. xvii. pt. ii. p. 688.

5. CULICIPETA POLIOGENYS, nobis, J. A. S. xvi. 441.

Length $4\frac{1}{4}$ in. : of wing $2\frac{1}{8}$ in., with the outermost primary $\frac{5}{8}$ in. long, the second exceeding it by $\frac{9}{16}$ in., and the third $\frac{1}{8}$ in. shorter than the fourth, which equals the fifth and sixth : tail $1\frac{5}{8}$ in. : bill to gape $\frac{9}{16}$ in. ; and tarse $\frac{5}{8}$ in. Bill dusky above, yellow or amber-coloured below. Legs pale. Plumage, above dark olive-green, slightly yellowish on rump, with a conspicuous narrow yellowish-white wing-band : crown and ear-coverts dusky-gray, with blackish coronal bands ; the chin, and feathers proceeding from the base of the lower mandible, grayish-white : rest of the lower parts bright yellow : tail with its three outer feathers white on the inner web, as in *C. pulchra*.

We have only seen this well-marked species from Sikkim. It might be mistaken for the preceding on a very superficial view ; but besides the differences in the details of colouring, its wings are much more rounded and the bill is somewhat less compressed.

6. CULICIPETA CASTANEOCEPS.

Abrornis castaneiceps, Hodgson, nobis, J. A. S. xiv. 593.

Abr. castaneiceps, H., Gray, Zool. Misc. 1844, p. 82 ; G. R. Gray, 'Appendix to Catalogue,' p. 152.

"Length $4\frac{1}{2}$ in. : wing nearly 2 in. : bill to gape above $\frac{5}{8}$ in. : tarse $\frac{5}{8}$ in. Upper surface olive-green : front and top of head pale rufous-chestnut ; hind-head and nape grayish-slate. Lower part of back and abdomen bright yellow : throat white : wings and tail brownish-black, margined with yellowish-green : greater coverts of the wings tipped with yellow, forming two bands."—*G. R. Gray*.

"Above vernal green : belly, vent, and croup, deep yellow. Chin to belly white, passing laterally to soft plumbeous. Top of head chestnut, bounded by black to sides. Bill and legs pale. Length 4 in. : wing $1\frac{1}{2}\frac{5}{8}$ in. : tail $1\frac{5}{8}$ in. : bill to forehead $\frac{5}{8}$ in. : tarse $\frac{5}{4}$ in."—*Hodgson*.

Procured by Mr. Hodgson in Nepal. We have never seen a specimen.

Finally, may be noticed a Javanese species of this group.

7. CULICIPETA TRIVIRGATA.

Sylvia trivirgata, Temminck, Verreaux MS.

Phylloscopus trivirgatus, Strickland, figured and described in Sir W. Jardine's 'Contributions to Ornithology,' November 1849.

"Length 4 in. ; of wing 2 in. 2 l. ; middle tail-feathers 1 in. 8 l. ; outermost $1\frac{1}{2}$ in. : bill to gape 5 l. ; tarse 7 l.

“In plumage it greatly resembles the broader-billed but closely allied *C. Burkii* of India. Middle of crown olive-yellow, which occupies the inner webs of the feathers, the outer webs being deep fuscous, nearly black, with an olive tinge, forming a broad dark stripe on each side of the crown: between this and the eye is a superciliary streak of clear yellow: a streak of fuscous passes through the eye; the cheeks, throat, and lower parts are bright yellow, with an olive tinge; back and wings yellowish-olive: beak horn-coloured, the base of lower mandible pale; and legs brown.

“Inhabits the island of Java.”—Strickland.

XVI.—On Fossil Echinoderms from the Island of Malta; with Notes on the stratigraphical distribution of the Fossil Organisms in the Maltese beds. By THOMAS WRIGHT, M.D. &c., Professor of the Natural Sciences in the Cheltenham Grammar School.

[[Continued from p. 127.]

Family SPATANGIDÆ.

The general outline of the Urchins of this family is oval, oblong or cordiform, and they satisfactorily exhibit the bilateral symmetry of the *Echinidæ*. The mouth is anterior, bilabiate, and edentulous. The anal opening is posterior and supramarginal, and is closed by a complicated series of small plates. The apices of the ambulacral areas are united at the summit of the test. The anterior single ambulacrum has a different structure from the antero- and postero-lateral pairs, and is in general lodged in a depression of the test, which extends to the anterior border forming the anteal sulcus; the test is extremely thin, and is covered with small tubercles which support hair-like spines; besides these there are some larger crenulated and perforated tubercles which support large spines. There are two or four genital pores which are sometimes placed close together, but are in other genera apart. The eye-plates are five in number, and are placed at the apices of the ambulacra in a pentagonal form around the genital plates. We observe on the surface of the test of some *Spatangidæ*, certain delicate lines called *fascioles*, having a smoother appearance than the tubercular surface of the test; they are furrows which are strewed with microscopic tubercles destined to carry very delicate spines, which, when seen under the microscope, appear to have the same structure as the *Pedicellariæ*. The *fascioles* have a different disposition in each genus, and afford a good character in giving definitions of the same; when the